PATENT ABSTRACTS OF JAPAN

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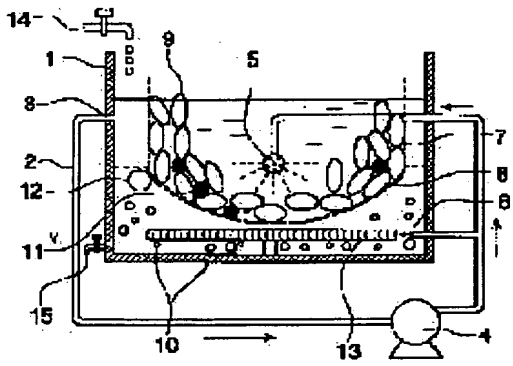
(54) DEVICE FOR DISSOLVING SOLID TREATING AGENT



(57)Abstract:
PROBLEM TO BE SOLVED: To rapidly dissolve plural pieces of a solid treating agent into water to dilute the agent and to facilitate the preparation of a treating solution by providing the device with a solid treating agent trapping means placed inside a solid treating agent dissolution vessel and a solid treating agent side circulation/delivery means having a solution delivery section placed on the solid treating agent side with respect to the solid treating agent trapping means.
SOLUTION: This device is provided with: a circulation means 2 that consists of a circulation pump 4, a solid treating agent side circulation/delivery means 5 and a circulation/delivery means 6 and is used for circulating a treating agent solution through a suction port 3 inside a solid treating agent dissolution vessel 1 and a water transfer pipe, wherein the suction port 3 is fitted with a filter or the like; and a solid treating agent trapping means 8 that is placed inside the solid treating agent dissolution vessel 1 and is used for preventing a solid treating agent 9 from being deposited on the inside of the solid treating agent dissolution vessel 1 or from blocking the liquid flow passage extending to the circulation means 2. At this time, in order to apply water to a broad region of the surface of each of the pieces of the solid treating agent, a part of the shape of the solid treating agent trapping means 8 is formed so as to be convex downward and also, the trapping means 8 is coated with a material having high slip properties, such as Teflon(R).

CLAIMS

[Claim(s)]
[Claim 1] Solid-state processing agent dissolution equipment characterized by having the solid-state processing agent side circulation regurgitation means which has a solution discharge part in the interior of a solid-state processing agent dissolver at a solid-state processing agent side to a solid-state processing agent prehension means and this solid-state processing agent supplement means.
[Claim 2] Solid-state processing agent dissolution equipment according to claim 1 characterized by having a solid-state processing agent antisticking means in a solid-state processing agent side to a solid-state processing agent prehension means.
[Claim 3] Solid-state processing agent dissolution equipment according to claim 1 or 2 characterized by a part of configuration of said solid-state processing agent supplement means being a convex downward.
[Claim 4] The solid-state processing agent dissolution equipment of the publication by any 1 term of claims 1-3 which carry out [having the lock-out prevention means of a minute solid-state processing agent prehension means at a minute solid-state processing agent side rather than a solid-state processing agent prehension means, the minute solid-state processing agent prehension means of by_which an eye is fine than this solid-state processing agent prehension means, and this minute solid-state processing agent prehension means, inside the solid-state processing agent dissolver of solid-state processing agent dissolution equipment, and] as the description.
[Claim 5] Solid-state processing agent dissolution equipment given in any 1 term of claims 1-4 characterized by having a floating generating means in a tub to operate according to the liquid regurgitation force from a circulation regurgitation means at the pars basilaris ossis occipitalis of a solid-state processing agent dissolver.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] It is especially related with the dissolution approach of a solid-state processing agent about the dissolution approach of the processing agent of silver halide photosensitive material.
[0002]
[Description of the Prior Art] Generally, the processing agent of silver halide photosensitive material circulated with concentration liquid, using the preparation equipment called a chemical mixer at the time of an activity, with water, carried out dilution preparation and has been used for used solution concentration. A tablet mold solid-state processing agent appears in recent years, a solid-state processing agent tablet type [two or more] is supplied, and the dissolution and dilution are performed by circulating through the solution in a tub with circulation means, such as stirring or a pump.
[0003] However, the solid-state processing agent, especially the tablet type solid-state processing agent had large path and thickness of a tablet, the component which is hard to dissolve in water was also further contained in the constituent of a solid-state processing agent, and since the preparation time amount of a solid-state processing agent was rate-limiting, the quick dissolution method of preparation was desired.

[0004]
[Problem(s) to be Solved by the Invention] The object of this invention is to offer a means to dissolve in water, to dilute promptly two or more solid-state processing agents, and to prepare processing liquid.
[0005]
[Means for Solving the Problem] 1. Solid-state processing agent dissolution equipment characterized by having solid-state processing agent side circulation regurgitation means which has solution discharge part in the interior of solid-state processing agent dissolver at solid-state processing agent side to solid-state processing agent prehension means and this solid-state processing agent supplement means.
[0006] 2. Solid-state processing agent dissolution equipment given in 1 characterized by having solid-state processing agent antisticking means in solid-state processing agent side to solid-state processing agent prehension means.
[0007] 3. 1 characterized by a part of configuration of said solid-state processing agent supplement means being convex downward, or solid-state processing agent dissolution equipment given in 2.
[0008] 4. Solid-state processing agent dissolution equipment of publication by any 1 term of 1-3 which carry out [having the lock-out prevention means of a minute solid-state processing agent prehension means at a minute solid-state processing agent side rather than a solid-state processing agent prehension means, the minute solid-state processing agent prehension means of by_which an eye is fine than this solid-state processing agent prehension means, and this minute solid-state processing agent prehension means, inside the solid-state processing agent dissolver of solid-state processing agent dissolution equipment and] as description.
[0009] 5. Solid-state processing agent dissolution equipment given in any 1 term of 1-4 which are characterized by having floating generating means in tub to operate according to liquid regurgitation force from circulation regurgitation means at pars basilaris ossis occipitalis of solid-state processing agent dissolver.
[0010] Hereafter, this invention is explained to a detail. The solid-state processing agent concerning this invention means what was solidified among a series of photograph developments, such as development, fixation or a halt of silver halide photosensitive material, and bleaching.
[0011] In order to solidify a processing agent, the means of the arbitration indicated by JP,4-29136,A, such as spraying a water-soluble binder on the front face of the photographic-processing agent which kneaded and cast a strong solution or fines thru/or a granular photographic-processing agent and a water-soluble binder, or carried out temporary molding, and forming an enveloping layer, 4-85535, 4-85536, 4-85533, 4-85534, 4-172341, etc. is employable. Although various gestalten, such as powder, granularity, or a tablet lock, can take a solid-state processing agent, a tablet-like processing agent is desirable also in these.
[0012] As a manufacturing method of a desirable tablet, after corning a powder-like processing agent component, it is the approach which forms by performing a making tablet process. A powdered processing agent component is only mixed, from the solid-state processing agent formed of the making tablet process, solubility and shelf life are improved and there is an advantage that the photograph engine performance also becomes stability as a result.
[0013] Well-known approaches, such as rolling granulation, extrusion granulation, compression granulation, crack granulation, stirring granulation, fluid bed granulation, and spray drying granulation, can be used for the granulation approach for tablet formation. In case the mean particle diameter of the granulation object obtained for

tablet formation mixes a granulation object and application-of-pressure compression is carried out, it is desirable to use a 100-800-micrometer thing in that ununiformity-izing of a component and the so-called segregation cannot happen easily, and it is 200-750 micrometers more preferably. Furthermore, as for particle size distribution, what has 60% or more of a granulation object particle in the deflection of **(100-150) mum is desirable.

[0014] In case the obtained granulation object is pressurized and compressed, a well-known compressor, for example, a hydraulic press machine, a single-engined type tableting machine, a rotary system tableting machine, and PURIKETTENGUMASHIN can be used. Although the solid-state processing agent which application of pressure and compression are carried out, and is obtained can take the configuration of arbitration, from the problem of the dust in the case of using it on a user side from a viewpoint of productivity and handling nature, the so-called tablet is desirable.

[0015] Furthermore, the above-mentioned effectiveness becomes remarkable further preferably by carrying out judgment granulation of every component, alkali chemicals, a reducing agent, the preservatives, etc. at the time of granulation.

[0016] The manufacture approach of a tablet processing agent can be manufactured by the general approach indicated by JP,51-61837,A, 54-155038, 52-88025, British JP,1,213,808,B, etc., and a granulation processing agent can be further manufactured by the general approach indicated by JP,2-109042,A, 2-109043, 3-39735, 3-39739, etc. furthermore -- again -- a powder processing agent -- for example, JP,54-133332,A and British JP,725,892,B -- said -- although indicated by No. 729,862, German JP,3,733,861,B, etc. -- **** -- it can manufacture by the general approach.

[0017] The bulk density of a solid-state processing agent has desirable 1.0 - 2.5 g/cm3, when it is a tablet from the point of the effectiveness of the object of the solubility and this invention. It is the point of the reinforcement of the solid which will be obtained if larger than 1.0 g/cm3, and when smaller than 2.5 g/cm3, it is more desirable in respect of the solubility of a solid.

[0018] When a solid-state processing agent is granulation or powder, the thing of bulk density of 0.40 - 0.95 g/cm3 is desirable.

[0019] As for a development tablet, it is desirable as a developing agent to contain reductones especially an ascorbic acid and/or erythorbic acid (stereoisomerism), and those salts.

[0020] Furthermore, the following developing agents may be contained. dihydroxybenzene (for example, hydroquinone and chloro hydroquinone --) BUROMO hydroquinone, dichloro hydroquinone, isopropyl hydroquinone, Methyl hydroquinone, 2, 3-dichloro hydroquinone, methoxy hydroquinone, A 2, 5-dimethyl hydroquinone, and hydroquinone mono-sulfonic-acid potassium, 3-pyrazolidone, such as hydroquinone mono-sulfonic-acid sodium for example, 1-phenyl-3-pyrazolidone and 1-phenyl-4-methyl-3-pyrazolidone -- The 1-phenyl -4, 4-dimethyl-3-pyrazolidone, 1-phenyl-4-ethyl-3-pyrazolidone, 1-phenyl-5-methyl-3-pyrazolidone, 1-phenyl-4-methyl-4-hydroxymethyl-3-pyrazolidone, The 1-phenyl -4, 4-dihydroxy methyl-3-pyrazolidone, 1-p-tolyl-3-pyrazolidone, The 1-phenyl-2-acetyl -4, 4-dimethyl-3-pyrazolidone, 1-(2-benzothiazole)-3-pyrazolidone, 3-acetoxy-1-phenyl-3-pyrazolidone, etc., aminophenols (for example, ortho aminophenol and para aminophenol --) N-methyl-ortho aminophenol, N-methyl-para aminophenol, 1-allyl compound [, such as 2 and 4-diaminophenol,]-3-amino pyrazolines for example, 1-(p-hydroxyphenyl)-3-amino pyrazoline -- Such mixture has pyrazolones (for example, 4-amino pyrazolone), such as 1-(p-methylamino phenyl)-3-amino pyrazoline and 1-

(p-amino-m-methylphenyl)-3-amino pyrazoline.
[0021] As for a development tablet, it is desirable to contain a sulfite and/or metabisulfite. Furthermore, the amount of sulfites in the liquid at the time of dissolving a tablet and considering as a developer has 0.05 mols/l. or more less than 0.3 mols [l.] /and desirable l. in 0.1 more mols/l. or more less than 0.3 mols /.
[0022] In addition, the bisulfite addition product of a chelating agent or a hardening agent can be used. Moreover, it is also desirable to add a silver sludge inhibitor. Addition of a cyclodextrin compound is also desirable and especially its compound given in JP,1-124853,A is desirable.
[0023] An amine compound can also be added to a developer and especially a compound given in U.S. Pat. No. 4,269,929 is desirable.
[0024] It is required for a developer to use a buffer and it can mention a sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, trisodium phosphate, tripotassium phosphate, dipotassium phosphate, sodium borate, a boric acid potassium, sodium tetraborate (borax), a 4 boric-acid potassium, o-hydroxybenzoic acid sodium (sodium salicylate), a salicylic-acid potassium, 5-sulfo-2-hydroxybenzoic-acid sodium (5-sulfosalicylic acid sodium), a 5-sulfosalicylic acid potassium, etc. to it as a buffer.
[0025] The carbonate which also has buffer action as alkali chemicals on the other hand is desirable. As a carbonate, potassium carbonate, a sodium carbonate, a lithium carbonate, etc. are mentioned.
[0026] Furthermore, the amount of carbonates in development liquid has desirable l. in 0.3 mols/l. or more less than 0.8 mols /.
[0027] As an accelerator, a thioether system compound, a p-phenylene diamine system compound, quarternary ammonium salt, para aminophenol, an amine system compound, polyalkylene oxide, other 1-phenyl-3-pyrazolidone, hydrazines, the Mesoyi-on mold compound, imidazole derivatives, etc. can be added if needed.
[0028] As a fogging inhibitor, the alkali-metal halogenide and the organic fogging inhibitor like a potassium bromide can be used. As an organic fogging inhibitor, the nitrogen-containing heterocyclic compound (1-phenyl-5-mercapto tetrazole as an example of representation) like benzotriazol, 6-nitrobenzimidazole, 5-nitroglycerine iso indazole, 5-methyl benzotriazol, 5-nitrobenzo triazole, 5-chlorobenzo triazole, 2-thiazolyl benzimidazole 2-thiazolyl methylbenzimidazol, indazole, hydroxyazaindolizine, and an adenine etc. can be mentioned, for example.
[0029] A cyclodextrin compound etc. can be further used for a developer constituent as an assistant of the improvement in solubility of a developing agent if needed. Furthermore, various additives, such as other stain inhibitors, a sludge inhibitor, and an interlayer effect accelerator, can be used.
[0030] The thing of 10.5 or less range is desirable still more desirable, and the range of pH of the developer obtained with a development tablet is 9-10.0.
[0031] In addition, the thing of a publication may be used for the developer obtained with a development tablet at 22-229 pages of L.F.A. meson work "photographic processing chemistry" Focal Press Co. ** (1966), U.S. Pat. No. 2,193,015, said 2,592,364 numbers, JP,48-64933,A, etc.
[0032] The fixer using a fixation tablet is described among solid-state processing agents.
[0033] A fixer prepares a fixation tablet, and dissolves and prepares. As a fixing agent, it is desirable to contain a thiosulfate. A fixer with a quick fixation rate is obtained by specifically using it as ammonium thiosulfate and a sodium-thiosulfate salt preferably, although a thiosulfate is used as a salt of a lithium, a potassium, sodium, and

ammonium.
[0034] In addition, an iodide salt, a thiocyanate, etc. can be used as a fixation chief remedy.
[0035] A fixer contains a sulfite. As a sulfite, a solid-state lithium, a potassium, sodium, ammonium salt, etc. are used.
[0036] A fixer may contain water-soluble chromium salt or a water-soluble aluminum salt. Chromium alum etc. is mentioned as water-soluble chromium salt, and an aluminum sulfate, an aluminum chloride potassium, an aluminum chloride, etc. can be mentioned as a water-soluble aluminum salt.
[0037] A fixer contains acetic-acid ion. The class of acetic-acid ion is arbitrary, although this invention is applicable to the compound of the arbitration which dissociates the acetic-acid ion in the inside of a fixer, the lithium of an acetic acid or an acetic acid, a potassium, sodium, ammonium salt, etc. are used preferably, and especially sodium salt and ammonium salt are desirable.
[0038] Furthermore, a citric acid, a tartaric acid, an apple acid, succinic acid, phenylacetic acids, these optical isomers, etc. may be contained.
[0039] As these salts (for example, the lithium represented by potassium citrate, lithium citrate, a sodium citrate, ammonium citrate, a tartaric-acid hydrogen lithium, a potassium hydrogen tartrate, a potassium tartrate, sodium bitartrate, the sodium tartrate, monoammonium tartrate, an ammonium tartrate potassium, a potassium sodium tartrate, apple acid sodium, apple acid ammonium, sodium succinate, succinic acid ammonium, etc., a potassium, sodium, ammonium salt, etc. are mentioned as a desirable object.)
[0040] As a more desirable thing in said compound, they are a citric acid, isocitric acid, an apple acid, phenylacetic acids, and these salts. As other acids, although organic acids, such as a salt of an inorganic acid like a sulfuric acid, a hydrochloric acid, a nitric acid, and boric acid, and a formic acid, a propionic acid, oxalic acid, an apple acid, are mentioned, for example, they are an acid and salts, such as boric acid and amino polycarboxylic acid, preferably.
[0041] As a chelating agent, amino polycarboxylic acid, these salts, etc., such as nitrilotriacetic acid and ethylenediaminetetraacetic acid, are mentioned, for example.
[0042] As a surfactant, nonionic surface active agents, such as anion activators, such as a sulfate ghost and a sulfonation object, a polyethylene-glycol system, and an ester system, a both-sexes activator, etc. are mentioned, for example.
[0043] As a wetting agent, alkanolamine, alkylene glycol, etc. are mentioned, for example.
[0044] As a fixation accelerator, alcohol, a thioether, etc. which have a triple bond are mentioned to a thiourea derivative and intramolecular.
[0045] A fixer has 4.2-5.5 preferably 3.8 or more pH.
[0046] The solid-state processing agent may consist of two or more classes, as long as development and fixation do not need to be one kind and have the special object.
[0047]
[Embodiment of the Invention] Next, the solid-state processing agent dissolver of this invention is explained.
[0048] The conceptual diagram of the solid-state processing agent dissolution equipment of this invention is shown in drawing 1 R> 1.
[0049] In drawing 1 , the circulation means 2 circulates through the circulating pump 4 for circulating through a solution through a water supply pipe from the up absorption opening 3 in the solid-state processing agent dissolver 1 for the up solid-state processing agent side circulation regurgitation means 5 and the circulation

regurgitation means 6 of a solid-state processing agent dissolver. A circulating pump can ** using various pumps, such as a magnet pump.
[0050] Since the inflow of a foreign matter or a non-dissolved solid-state processing agent is prevented, a filter and a strainer can also be used for the suction opening 3 of a circulation means.
[0051] The solid-state processing agent 9 accumulates on the solid-state processing agent dissolver 1, or it is installed in a solid-state processing agent dissolver in order to prevent blockading the liquid passage which results in the circulation means 2, and the area of one hole is 2 0.1-1000mm in a porous diaphragm, and, as for the solid-state processing agent prehension means 8, especially 2 is desirable 1-10mm. Although stainless steel material, such as SUS316, is suitable at the point with corrosive [by the solid-state processing agent / the abrasiveness or corrosive / little], resin, such as PVC, is sufficient as construction material.
[0052] It is important to distribute according to the liquid blowout force from the circulation regurgitation means 6 of the lower part of the solid-state processing agent dissolver 1, without the solid-state processing agent 9 overlapping as large the range on the solid-state processing agent prehension means 8 as possible especially in order to apply water to as large the part of a solid-state processing agent front face as possible. As simplest approach, a part of configuration of a solid-state processing agent prehension means can be made down at a convex, and the approach of changing an ingredient like Teflon on which it is easy to slide into the raw material which is easy to slide on coating or solid-state processing agent prehension means 8 the very thing on a solid-state processing agent prehension means can be used.
[0053] Although it is the means which prevents the minute solid-state processing agent prehension means 7 trespassing upon the liquid passage where the minute solid-state processing agent 10 results in the circulation means 2, and it is desirable to be installed in the solid-state processing agent dissolver 1 and it has many holes like the solid-state processing agent prehension means 8 An eye is finer than a solid-state processing agent prehension means, as for the area of one hole, it is desirable that it is 2 0.01-10mm, and it is desirable that it is especially 2 0.5-5mm.
[0054] Although the construction material of the minute solid-state processing agent prehension means 7 has the most desirable stainless steel material of abrasiveness or a corrosive point to SUS316 grade, it does not interfere, even if it makes all or a part into rubber, such as resin, such as PVC and nylon, a neoprene, and a Viton.
[0055] The solid-state processing agent side circulation regurgitation means 5 is a thing for spraying the liquid from the circulation means 2 on the solid-state processing agent on the solid-state processing agent prehension means 8, and bringing the dissolution forward, and it is desirable to have two or more discharge openings in the discharge part. Processing is an easy point, the circular thing with a diameter of 0.3-5mm of a discharge opening is desirable, and it is desirable that it is especially 1-3mm.
[0056] In order to make a maintenance easy, it is convenient, if a coupler, HERURU, etc. are prepared and you make removable the water supply pipe part inside the solid-state processing agent dissolver 1.
[0057] There is the amount of liquid discharge flow from the solid-state processing agent side circulation regurgitation means 5 in early stages of the dissolution, when they go through fixed time amount, they can still hope that it can be made to carry out adjustable according to a situation so that it may say that it is made [many], and they can prevent now scattering to the dissolver exterior of discharged liquid upon which it rebounded in the solid-state processing agent etc. [few]
[0058] As for the discharge part of the solid-state processing agent side circulation

regurgitation means 5, plurality does not interfere, either, and rather than the solid-state processing agent prehension means 8, especially if the location of a discharge part is a solid-state processing agent side, it will not be limited.
[0059] Two or more solid-state processing agent antisticking means 11 can be formed in the solid-state processing agent side on the solid-state processing agent prehension means 8, in order for a solid-state processing agent and a minute solid-state processing agent to prevent re-condensing and becoming a big lump in process of the dissolution, and various things, such as metal, a sphere made of resin, and a cylinder object, can be used.
[0060] The sphere made from PVC which are the stainless steel spherical shell whose interior whose diameter is 3-30mm is hollow, and the diameter of 3-10mm is desirable at especially the point that is easy to move according to a liquid flow.
[0061] One or more lock out prevention means 12 of the minute solid-state processing agent prehension means 7 are established in order for the hole of a minute detailed solid-state processing agent prehension means to prevent blockading by the non-dissolved minute solid-state processing agent, and reducing the flow rate of a circulation means, and plugging etc. is prevented by giving an impact to a minute solid-state processing agent prehension means according to the liquid flow in a tub.
[0062] Although various things, such as metal, a sphere made of resin, and a cylinder object, can be used, especially the spherical shell whose interior made from the stainless steel of corrosive or abrasiveness to SUS316 grade is hollow is desirable.
[0063] In the floating generating means 13 in a tub, one or more are installed in the lower part of the solid-state processing agent dissolver 1, by receiving the liquid style from the circulation means 2 from the discharge part of the circulation regurgitation means 6, revolution actuation is carried out, deposition of the minute solid-state processing agent 10 to a solid-state processing agent dissolver is prevented, and the dissolution is promoted.
[0064] As a member of the floating generating means in a tub, it is desirable a lightweight thing and that it is the point that lubricity with the revolving-shaft section is excellent, and is especially resin, such as PVC.
[0065] In addition, the upper part of the solid-state processing agent dissolver 1 and the lower part shall have pointed out the between to 30mm to 30mm of lower parts, and the upper part from the bottom of a tub from the upper limb of a solid-state processing agent dissolver.
[0066] The solid-state processing agent 9 is said tablet type of solid-state processing agent, and points out the tablet of the cylindrical shape which are the diameter of 5-50mm, and the thickness of 3-20mm, or the granulation of the infinite form whose major axis which is acquired by carrying out compression molding with a briquette machine is 4-40mm.
[0067] the fragment to which the solid-state processing agent broke by the impact or wear in the minute solid-state processing agent 10 -- a part of non-dissolved solid-state processing agent was still pointed out, and the major axis has pointed out the less than 4mm thing.
[0068] Next, the developer obtained by dissolving a development tablet and this development tablet among solid-state processing agents is explained.
[0069]
[Example] Although one or less example and an example explain this invention, this invention is not limited to these.
[0070] (Production of a solid-state processing agent)
<Production of the development tablet A> 1-phenyl-3-pyrazolidone is ground until it

is set to an average of 10 micrometers in a bantamweight division mill, respectively in 570g, N-acetyl D, and L-penicillamine 10g and 1000g of glutaraldehyde bis-sodium-sulfite salts. 1200g of sodium metabisulfite and 4000g of sodium erythorbate are added to these fines. Furthermore, add 150g of D-sorbitol, and 150g of D-mannitols as a saccharide, and it mixes in a mill for 3 minutes. The addition of the water containing the No. 1 blue of 0.3g was set to 30ml, the stirring granulation was performed, the granulation object was dried at 40 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object A was obtained.

[0071] The compression making tablet was performed having mixed the granulation object A for 10 minutes with the rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the development tablet A of a cylindrical shape with a diameter of 30mm was produced.

[0072] <Production of the development tablet B> 10000g of potassium carbonate and 200g of sodium bicarbonate are ground until it is set to an average of 10 micrometers in a bantamweight division mill, respectively. To the obtained fines, DTPA and 5Na250g, 1-phenyl 5-mercapto tetrazole 7.0g, Add 800g of D-mannitols, mix in a mill for 3 minutes, set the addition of the water containing the No. 1 blue of 0.06g to 30ml, and a stirring granulation is performed. The granulation object was dried at 40 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object B was obtained.

[0073] The compression making tablet was performed having mixed the granulation object B for 10 minutes with the rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the development tablet B of a cylindrical shape with a diameter of 30mm was produced.

[0074] <Production of the fixation tablet A> It grinds until it is set to an average of 10 micrometers in the bantamweight division mill of ammonium thiosulfate / 14580g [of sodium thiosulfates] (90/10-fold quantitative ratio) marketing. 550g [of sodium sulfites], 750g [of sodium metabisulfite], and pineapple flow 1220g was added to these fines, the addition of the water containing the No. 1 blue of 0.5g was set to 50ml, the stirring granulation was performed, the granulation object was dried at 50 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object A was obtained.

[0075] Thus, the compression making tablet was performed having mixed for 5 minutes in the obtained granulation object A with 3000g of beta alanines, 4330g of sodium acetate, and a rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the fixation tablet A of a cylindrical shape with a diameter of 30mm was produced.

[0076] <Production of the fixation tablet B> 600g of boric acids, 1480g of sulfuric-acid aluminum and 8 monohydrates, 1100g of succinic acid, and 300g of tartaric acids are ground until marketing is also set to an average of 10 micrometers in a bantamweight division mill. 250g of D-mannitols and 50g of D-sorbitol were added to these fines, the addition of the water containing the No. 1 blue of 0.4g was set to 30ml, the stirring granulation was performed, the granulation object was dried at 50 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object B was obtained.

[0077] Furthermore, 750g of sodium acetate was added to the granulation object B, and it mixed for 5 minutes with the rotary mixer, and the compression making tablet was performed having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the fixation tablet B of a cylindrical shape with a diameter of 30mm was produced.
[0078] (Measurement of a dissolution duration) Solid-state development tablet A agent 50 locks and B agent 50 locks were put in in the solid-state processing agent prehension means of solid-state processing agent dissolution equipment, and it dissolved, adding and circulating through 4400ml of 35-degree C water. Under the present circumstances, time amount until the dissolution is completed from the flash which poured in water was measured.
[0079] Solid-state fixation tablet A agent 90 locks and B agent 30 locks were similarly put in in the solid-state processing agent prehension means of solid-state processing agent dissolution equipment, and it dissolved, adding and circulating through 4200ml of 35-degree C water. Under the present circumstances, time amount until the dissolution is completed from the flash which poured in water was measured.
[0080] The conditions of each means are the following among solid-state processing agent dissolution equipment.
[0081] Solid-state Processing Agent Prehension Means : 1. Area 2, Diameter of 3Mm of Hole of 180Cm of Opening, 2. -- minute solid-state processing agent prehension means: -- area 2 and the diameter of 1mm of a hole of 150cm of opening 3. -- solid-state processing agent side circulation regurgitation means: -- discharge part diameter [of 2mm] x20 hole, and 4. solid-state processing agent -- ten spheres of a vinyl chloride with an antisticking means:diameter of 6mm 5. -- lock out prevention means [of a minute solid-state processing agent prehension means]: -- they are the diameter of 140mm, and six sphere [of a vinyl chloride with a diameter of 6mm], and floating generating means:span 10mm six-sheet configuration in 6. tub -- as a comparison The dissolution duration was measured using the conventional dissolution approach which consists of only a solid-state processing agent dissolver and a circulation means.
[0082] These results were collectively shown in a table 1.
[0083]
[A table 1]

[0084] A table 1 shows that the solid-state processing agent dissolution equipment of this invention has the outstanding melting capacity.
[0085]
[Effect of the Invention] A means to have dissolved in water, to have diluted promptly two or more solid-state processing agents, and to prepare processing liquid by this invention was able to be offered.

TECHNICAL FIELD

[Field of the Invention] It is especially related with the dissolution approach of a solid-state processing agent about the dissolution approach of the processing agent of silver halide photosensitive material.

PRIOR ART

[Description of the Prior Art] Generally, the processing agent of silver halide photosensitive material circulated with concentration liquid, using the preparation equipment called a chemical mixer at the time of an activity, with water, carried out dilution preparation and has been used for used solution concentration. A tablet mold solid-state processing agent appears in recent years, a solid-state processing agent tablet type [two or more] is supplied, and the dissolution and dilution are performed by circulating through the solution in a tub with circulation means, such as stirring or a pump.

[0003] However, the solid-state processing agent, especially the tablet type solid-state processing agent had large path and thickness of a tablet, the component which is hard to dissolve in water was also further contained in the constituent of a solid-state processing agent, and since the preparation time amount of a solid-state processing agent was rate-limiting, the quick dissolution method of preparation was desired.

EFFECT OF THE INVENTION

[Effect of the Invention] A means to have dissolved in water, to have diluted promptly two or more solid-state processing agents, and to prepare processing liquid by this invention was able to be offered.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The object of this invention is to offer a means to dissolve in water, to dilute promptly two or more solid-state processing agents, and to prepare processing liquid.

MEANS

[Means for Solving the Problem] 1. Solid-state processing agent dissolution equipment characterized by having solid-state processing agent side circulation regurgitation means which has solution discharge part in the interior of solid-state processing agent dissolver at solid-state processing agent side to solid-state processing agent prehension means and this solid-state processing agent supplement means.

[0006] 2. Solid-state processing agent dissolution equipment given in 1 characterized by having solid-state processing agent antisticking means in solid-state processing agent side to solid-state processing agent prehension means.

[0007] 3. 1 characterized by a part of configuration of said solid-state processing agent supplement means being convex downward, or solid-state processing agent dissolution equipment given in 2.

[0008] 4. Solid-state processing agent dissolution equipment of publication by any 1 term of 1-3 which carry out [having the lock-out prevention means of a minute solid-state processing agent prehension means at a minute solid-state processing agent side rather than a solid-state processing agent prehension means, the minute solid-state processing agent prehension means of by_which an eye is fine than this solid-state processing agent prehension means, and this minute solid-state processing agent prehension means, inside the solid-state processing agent dissolver of solid-state

processing agent dissolution equipment, and] as description.
[0009] 5. Solid-state processing agent dissolution equipment given in any 1 term of 1-4 which are characterized by having floating generating means in tub to operate according to liquid regurgitation force from circulation regurgitation means at pars basilaris ossis occipitalis of solid-state processing agent dissolver.
[0010] Hereafter, this invention is explained to a detail. The solid-state processing agent concerning this invention means what was solidified among a series of photograph developments, such as development, fixation or a halt of silver halide photosensitive material, and bleaching.
[0011] In order to solidify a processing agent, the means of the arbitration indicated by JP,4-29136,A, such as spraying a water-soluble binder on the front face of the photographic-processing agent which kneaded and cast a strong solution or fines thru/or a granular photographic-processing agent and a water-soluble binder, or carried out temporary molding, and forming an enveloping layer, 4-85535, 4-85536, 4-85533, 4-85534, 4-172341, etc. is employable. Although various gestalten, such as powder, granularity, or a tablet lock, can take a solid-state processing agent, a tablet-like processing agent is desirable also in these.
[0012] As a manufacturing method of a desirable tablet, after corning a powder-like processing agent component, it is the approach which forms by performing a making tablet process. A powdered processing agent component is only mixed, from the solid-state processing agent formed of the making tablet process, solubility and shelf life are improved and there is an advantage that the photograph engine performance also becomes stability as a result.
[0013] Well-known approaches, such as rolling granulation, extrusion granulation, compression granulation, crack granulation, stirring granulation, fluid bed granulation, and spray drying granulation, can be used for the granulation approach for tablet formation. In case the mean particle diameter of the granulation object obtained for tablet formation mixes a granulation object and application-of-pressure compression is carried out, it is desirable to use a 100-800-micrometer thing in that ununiformity-izing of a component and the so-called segregation cannot happen easily, and it is 200-750 micrometers more preferably. Furthermore, as for particle size distribution, what has 60% or more of a granulation object particle in the deflection of **(100-150) mum is desirable.
[0014] In case the obtained granulation object is pressurized and compressed, a well-known compressor, for example, a hydraulic press machine, a single-engined type tableting machine, a rotary system tableting machine, and PURIKETTENGUMASHIN can be used. Although the solid-state processing agent which application of pressure and compression are carried out, and is obtained can take the configuration of arbitration, from the problem of the dust in the case of using it on a user side from a viewpoint of productivity and handling nature, the so-called tablet is desirable.
[0015] Furthermore, the above-mentioned effectiveness becomes remarkable further preferably by carrying out judgment granulation of every component, alkali chemicals, a reducing agent, the preservatives, etc. at the time of granulation.
[0016] The manufacture approach of a tablet processing agent can be manufactured by the general approach indicated by JP,51-61837,A, 54-155038, 52-88025, British JP,1,213,808,B, etc., and a granulation processing agent can be further manufactured by the general approach indicated by JP,2-109042,A, 2-109043, 3-39735, 3-39739, etc. furthermore -- again -- a powder processing agent -- for example, JP,54-133332,A and British JP,725,892,B -- said -- although indicated by No. 729,862, German

JP,3,733,861,B, etc. -- **** -- it can manufacture by the general approach.
[0017] The bulk density of a solid-state processing agent has desirable 1.0 - 2.5 g/cm3, when it is a tablet from the point of the effectiveness of the object of the solubility and this invention. It is the point of the reinforcement of the solid which will be obtained if larger than 1.0 g/cm3, and when smaller than 2.5 g/cm3, it is more desirable in respect of the solubility of a solid.
[0018] When a solid-state processing agent is granulation or powder, the thing of bulk density of 0.40 - 0.95 g/cm3 is desirable.
[0019] As for a development tablet, it is desirable as a developing agent to contain reductones especially an ascorbic acid and/or erythorbic acid (stereoisomerism), and those salts.
[0020] Furthermore, the following developing agents may be contained. dihydroxybenzene (for example, hydroquinone and chloro hydroquinone --) BUROMO hydroquinone, dichloro hydroquinone, isopropyl hydroquinone, Methyl hydroquinone, 2, 3-dichloro hydroquinone, methoxy hydroquinone, A 2, 5-dimethyl hydroquinone, and hydroquinone mono-sulfonic-acid potassium, 3-pyrazolidone, such as hydroquinone mono-sulfonic-acid sodium for example, 1-phenyl-3-pyrazolidone and 1-phenyl-4-methyl-3-pyrazolidone -- The 1-phenyl -4, 4-dimethyl-3-pyrazolidone, 1-phenyl-4-ethyl-3-pyrazolidone, 1-phenyl-5-methyl-3-pyrazolidone, 1-phenyl-4-methyl-4-hydroxymethyl-3-pyrazolidone, The 1-phenyl -4, 4-dihydroxy methyl-3-pyrazolidone, 1-p-tolyl-3-pyrazolidone, The 1-phenyl-2-acetyl -4, 4-dimethyl-3-pyrazolidone, 1-(2-benzothiazole)-3-pyrazolidone, 3-acetoxy-1-phenyl-3-pyrazolidone, etc., aminophenols (for example, ortho aminophenol and para aminophenol --) N-methyl-ortho aminophenol, N-methyl-para aminophenol, 1-allyl compound [, such as 2 and 4-diaminophenol,]-3-amino pyrazolines for example, 1-(p-hydroxyphenyl)-3-amino pyrazoline -- Such mixture has pyrazolones (for example, 4-amino pyrazolone), such as 1-(p-methylamino phenyl)-3-amino pyrazoline and 1-(p-amino-m-methylphenyl)-3-amino pyrazoline.
[0021] As for a development tablet, it is desirable to contain a sulfite and/or metabisulfite. Furthermore, the amount of sulfites in the liquid at the time of dissolving a tablet and considering as a developer has 0.05 mols/l. or more less than 0.3 mols [l.] /and desirable l. in 0.1 more mols/l. or more less than 0.3 mols /.
[0022] In addition, the bisulfite addition product of a chelating agent or a hardening agent can be used. Moreover, it is also desirable to add a silver sludge inhibitor. Addition of a cyclodextrin compound is also desirable and especially its compound given in JP,1-124853,A is desirable.
[0023] An amine compound can also be added to a developer and especially a compound given in U.S. Pat. No. 4,269,929 is desirable.
[0024] It is required for a developer to use a buffer and it can mention a sodium carbonate, potassium carbonate, sodium bicarbonate, potassium bicarbonate, trisodium phosphate, tripotassium phosphate, dipotassium phosphate, sodium borate, a boric acid potassium, sodium tetraborate (borax), a 4 boric-acid potassium, o-hydroxybenzoic acid sodium (sodium salicylate), a salicylic-acid potassium, 5-sulfo-2-hydroxybenzoic-acid sodium (5-sulfosalicylic acid sodium), a 5-sulfosalicylic acid potassium, etc. to it as a buffer.
[0025] The carbonate which also has buffer action as alkali chemicals on the other hand is desirable. As a carbonate, potassium carbonate, a sodium carbonate, a lithium carbonate, etc. are mentioned.
[0026] Furthermore, the amount of carbonates in development liquid has desirable l. in 0.3 mols/l. or more less than 0.8 mols /.

[0027] As an accelerator, a thioether system compound, a p-phenylene diamine system compound, quarternary ammonium salt, para aminophenol, an amine system compound, polyalkylene oxide, other 1-phenyl-3-pyrazolidone, hydrazines, the Mesoyi-on mold compound, imidazole derivatives, etc. can be added if needed.
[0028] As a fogging inhibitor, the alkali-metal halogenide and the organic fogging inhibitor like a potassium bromide can be used. As an organic fogging inhibitor, the nitrogen-containing heterocyclic compound (1-phenyl-5-mercapto tetrazole as an example of representation) like benzotriazol, 6-nitrobenzimidazole, 5-nitroglycerine iso indazole, 5-methyl benzotriazol, 5-nitrobenzo triazole, 5-chlorobenzo triazole, 2-thiazolyl benzimidazole 2-thiazolyl methylbenzimidazol, indazole, hydroxyazaindolizine, and an adenine etc. can be mentioned, for example.
[0029] A cyclodextrin compound etc. can be further used for a developer constituent as an assistant of the improvement in solubility of a developing agent if needed. Furthermore, various additives, such as other stain inhibitors, a sludge inhibitor, and an interlayer effect accelerator, can be used.
[0030] The thing of 10.5 or less range is desirable still more desirable, and the range of pH of the developer obtained with a development tablet is 9-10.0.
[0031] In addition, the thing of a publication may be used for the developer obtained with a development tablet at 22-229 pages of L.F.A. meson work "photographic processing chemistry" Focal Press Co. ** (1966), U.S. Pat. No. 2,193,015, said 2,592,364 numbers, JP,48-64933,A, etc.
[0032] The fixer using a fixation tablet is described among solid-state processing agents.
[0033] A fixer prepares a fixation tablet, and dissolves and prepares. As a fixing agent, it is desirable to contain a thiosulfate. A fixer with a quick fixation rate is obtained by specifically using it as ammonium thiosulfate and a sodium-thiosulfate salt preferably, although a thiosulfate is used as a salt of a lithium, a potassium, sodium, and ammonium.
[0034] In addition, an iodide salt, a thiocyanate, etc. can be used as a fixation chief remedy.
[0035] A fixer contains a sulfite. As a sulfite, a solid-state lithium, a potassium, sodium, ammonium salt, etc. are used.
[0036] A fixer may contain water-soluble chromium salt or a water-soluble aluminum salt. Chromium alum etc. is mentioned as water-soluble chromium salt, and an aluminum sulfate, an aluminum chloride potassium, an aluminum chloride, etc. can be mentioned as a water-soluble aluminum salt.
[0037] A fixer contains acetic-acid ion. The class of acetic-acid ion is arbitrary, although this invention is applicable to the compound of the arbitration which dissociates the acetic-acid ion in the inside of a fixer, the lithium of an acetic acid or an acetic acid, a potassium, sodium, ammonium salt, etc. are used preferably, and especially sodium salt and ammonium salt are desirable.
[0038] Furthermore, a citric acid, a tartaric acid, an apple acid, succinic acid, phenylacetic acids, these optical isomers, etc. may be contained.
[0039] As these salts (for example, the lithium represented by potassium citrate, lithium citrate, a sodium citrate, ammonium citrate, a tartaric-acid hydrogen lithium, a potassium hydrogen tartrate, a potassium tartrate, sodium bitartrate, the sodium tartrate, monoammonium tartrate, an ammonium tartrate potassium, a potassium sodium tartrate, apple acid sodium, apple acid ammonium, sodium succinate, succinic acid ammonium, etc., a potassium, sodium, ammonium salt, etc. are mentioned as a desirable object.)

[0040] As a more desirable thing in said compound, they are a citric acid, isocitric acid, an apple acid, phenylacetic acids, and these salts. As other acids, although organic acids, such as a salt of an inorganic acid like a sulfuric acid, a hydrochloric acid, a nitric acid, and boric acid, and a formic acid, a propionic acid, oxalic acid, an apple acid, are mentioned, for example, they are an acid and salts, such as boric acid and amino polycarboxylic acid, preferably.
[0041] As a chelating agent, amino polycarboxylic acid, these salts, etc., such as nitrilotriacetic acid and ethylenediaminetetraacetic acid, are mentioned, for example.
[0042] As a surfactant, nonionic surface active agents, such as anion activators, such as a sulfate ghost and a sulfonation object, a polyethylene-glycol system, and an ester system, a both-sexes activator, etc. are mentioned, for example.
[0043] As a wetting agent, alkanolamine, alkylene glycol, etc. are mentioned, for example.
[0044] As a fixation accelerator, alcohol, a thioether, etc. which have a triple bond are mentioned to a thiourea derivative and intramolecular.
[0045] A fixer has 4.2-5.5 preferably 3.8 or more pH.
[0046] The solid-state processing agent may consist of two or more classes, as long as development and fixation do not need to be one kind and have the special object.
[0047]
[Embodiment of the Invention] Next, the solid-state processing agent dissolver of this invention is explained.
[0048] The conceptual diagram of the solid-state processing agent dissolution equipment of this invention is shown in drawing 1 R> 1.
[0049] In drawing 1 , the circulation means 2 circulates through the circulating pump 4 for circulating through a solution through a water supply pipe from the up absorption opening 3 in the solid-state processing agent dissolver 1 for the up solid-state processing agent side circulation regurgitation means 5 and the circulation regurgitation means 6 of a solid-state processing agent dissolver. A circulating pump can ** using various pumps, such as a magnet pump.
[0050] Since the inflow of a foreign matter or a non-dissolved solid-state processing agent is prevented, a filter and a strainer can also be used for the suction opening 3 of a circulation means.
[0051] The solid-state processing agent 9 accumulates on the solid-state processing agent dissolver 1, or it is installed in a solid-state processing agent dissolver in order to prevent blockading the liquid passage which results in the circulation means 2, and the area of one hole is 2 0.1-1000mm in a porous diaphragm, and, as for the solid-state processing agent prehension means 8, especially 2 is desirable 1-10mm. Although stainless steel material, such as SUS316, is suitable at the point with corrosive [by the solid-state processing agent / the abrasiveness or corrosive / little], resin, such as PVC, is sufficient as construction material.
[0052] It is important to distribute according to the liquid blowout force from the circulation regurgitation means 6 of the lower part of the solid-state processing agent dissolver 1, without the solid-state processing agent 9 overlapping as large the range on the solid-state processing agent prehension means 8 as possible especially in order to apply water to as large the part of a solid-state processing agent front face as possible. As simplest approach, a part of configuration of a solid-state processing agent prehension means can be made down at a convex, and the approach of changing an ingredient like Teflon on which it is easy to slide into the raw material which is easy to slide on coating or solid-state processing agent prehension means 8 the very thing on a solid-state processing agent prehension means can be used.

[0053] Although it is the means which prevents the minute solid-state processing agent prehension means 7 trespassing upon the liquid passage where the minute solid-state processing agent 10 results in the circulation means 2, and it is desirable to be installed in the solid-state processing agent dissolver 1 and it has many holes like the solid-state processing agent prehension means 8 An eye is finer than a solid-state processing agent prehension means, as for the area of one hole, it is desirable that it is 2 0.01-10mm, and it is desirable that it is especially 2 0.5-5mm.
[0054] Although the construction material of the minute solid-state processing agent prehension means 7 has the most desirable stainless steel material of abrasiveness or a corrosive point to SUS316 grade, it does not interfere, even if it makes all or a part into rubber, such as resin, such as PVC and nylon, a neoprene, and a Viton.
[0055] The solid-state processing agent side circulation regurgitation means 5 is a thing for spraying the liquid from the circulation means 2 on the solid-state processing agent on the solid-state processing agent prehension means 8, and bringing the dissolution forward, and it is desirable to have two or more discharge openings in the discharge part. Processing is an easy point, the circular thing with a diameter of 0.3-5mm of a discharge opening is desirable, and it is desirable that it is especially 1-3mm.
[0056] In order to make a maintenance easy, it is convenient, if a coupler, HERURU, etc. are prepared and you make removable the water supply pipe part inside the solid-state processing agent dissolver 1.
[0057] There is the amount of liquid discharge flow from the solid-state processing agent side circulation regurgitation means 5 in early stages of the dissolution, when they go through fixed time amount, they can still hope that it can be made to carry out adjustable according to a situation so that it may say that it is made [many], and they can prevent now scattering to the dissolver exterior of discharged liquid upon which it rebounded in the solid-state processing agent etc. [few]
[0058] As for the discharge part of the solid-state processing agent side circulation regurgitation means 5, plurality does not interfere, either, and rather than the solid-state processing agent prehension means 8, especially if the location of a discharge part is a solid-state processing agent side, it will not be limited.
[0059] Two or more solid-state processing agent antisticking means 11 can be formed in the solid-state processing agent side on the solid-state processing agent prehension means 8, in order for a solid-state processing agent and a minute solid-state processing agent to prevent re-condensing and becoming a big lump in process of the dissolution, and various things, such as metal, a sphere made of resin, and a cylinder object, can be used.
[0060] The sphere made from PVC which are the stainless steel spherical shell whose interior whose diameter is 3-30mm is hollow, and the diameter of 3-10mm is desirable at especially the point that is easy to move according to a liquid flow.
[0061] One or more lock out prevention means 12 of the minute solid-state processing agent prehension means 7 are established in order for the hole of a minute detailed solid-state processing agent prehension means to prevent blockading by the non-dissolved minute solid-state processing agent, and reducing the flow rate of a circulation means, and plugging etc. is prevented by giving an impact to a minute solid-state processing agent prehension means according to the liquid flow in a tub.
[0062] Although various things, such as metal, a sphere made of resin, and a cylinder object, can be used, especially the spherical shell whose interior made from the stainless steel of corrosive or abrasiveness to SUS316 grade is hollow is desirable.
[0063] In the floating generating means 13 in a tub, one or more are installed in the lower part of the solid-state processing agent dissolver 1, by receiving the liquid style

from the circulation means 2 from the discharge part of the circulation regurgitation means 6, revolution actuation is carried out, deposition of the minute solid-state processing agent 10 to a solid-state processing agent dissolver is prevented, and the dissolution is promoted.

[0064] As a member of the floating generating means in a tub, it is desirable a lightweight thing and that it is the point that lubricity with the revolving-shaft section is excellent, and is especially resin, such as PVC.

[0065] In addition, the upper part of the solid-state processing agent dissolver 1 and the lower part shall have pointed out the between to 30mm to 30mm of lower parts, and the upper part from the bottom of a tub from the upper limb of a solid-state processing agent dissolver.

[0066] The solid-state processing agent 9 is said tablet type of solid-state processing agent, and points out the tablet of the cylindrical shape which are the diameter of 5-50mm, and the thickness of 3-20mm, or the granulation of the infinite form whose major axis which is acquired by carrying out compression molding with a briquette machine is 4-40mm.

[0067] the fragment to which the solid-state processing agent broke by the impact or wear in the minute solid-state processing agent 10 -- a part of non-dissolved solid-state processing agent was still pointed out, and the major axis has pointed out the less than 4mm thing.

[0068] Next, the developer obtained by dissolving a development tablet and this development tablet among solid-state processing agents is explained.

EXAMPLE

[Example] Although one or less example and an example explain this invention, this invention is not limited to these.

[0070] (Production of a solid-state processing agent)

<Production of the development tablet A> 1-phenyl-3-pyrazolidone is ground until it is set to an average of 10 micrometers in a bantamweight division mill, respectively in 570g, N-acetyl D, and L-penicillamine 10g and 1000g of glutaraldehyde bis-sodium-sulfite salts. 1200g of sodium metabisulfite and 4000g of sodium erythorbate are added to these fines. Furthermore, add 150g of D-sorbitol, and 150g of D-mannitols as a saccharide, and it mixes in a mill for 3 minutes. The addition of the water containing the No. 1 blue of 0.3g was set to 30ml, the stirring granulation was performed, the granulation object was dried at 40 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object A was obtained.

[0071] The compression making tablet was performed having mixed the granulation object A for 10 minutes with the rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the development tablet A of a cylindrical shape with a diameter of 30mm was produced.

[0072] <Production of the development tablet B> 10000g of potassium carbonate and 200g of sodium bicarbonate are ground until it is set to an average of 10 micrometers in a bantamweight division mill, respectively. To the obtained fines, DTPA and 5Na250g, 1-phenyl 5-mercapto tetrazole 7.0g, Add 800g of D-mannitols, mix in a mill for 3 minutes, set the addition of the water containing the No. 1 blue of 0.06g to 30ml, and a stirring granulation is performed. The granulation object was dried at 40

degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object B was obtained.
[0073] The compression making tablet was performed having mixed the granulation object B for 10 minutes with the rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the development tablet B of a cylindrical shape with a diameter of 30mm was produced.
[0074] <Production of the fixation tablet A> It grinds until it is set to an average of 10 micrometers in the bantamweight division mill of ammonium thiosulfate / 14580g [of sodium thiosulfates] (90/10-fold quantitative ratio) marketing. 550g [of sodium sulfites], 750g [of sodium metabisulfite], and pineapple flow 1220g was added to these fines, the addition of the water containing the No. 1 blue of 0.5g was set to 50ml, the stirring granulation was performed, the granulation object was dried at 50 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object A was obtained.
[0075] Thus, the compression making tablet was performed having mixed for 5 minutes in the obtained granulation object A with 3000g of beta alanines, 4330g of sodium acetate, and a rotary mixer, and having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the fixation tablet A of a cylindrical shape with a diameter of 30mm was produced.
[0076] <Production of the fixation tablet B> 600g of boric acids, 1480g of sulfuric-acid aluminum and 8 monohydrates, 1100g of succinic acid, and 300g of tartaric acids are ground until marketing is also set to an average of 10 micrometers in a bantamweight division mill. 250g of D-mannitols and 50g of D-sorbitol were added to these fines, the addition of the water containing the No. 1 blue of 0.4g was set to 30ml, the stirring granulation was performed, the granulation object was dried at 50 degrees C with the fluidized-drying vessel, moisture was removed nearly thoroughly, the particle size regulation was carried out with the particle size regulation machine equipped with a 1.0 moremm mesh, and the granulation object B was obtained.
[0077] Furthermore, 750g of sodium acetate was added to the granulation object B, and it mixed for 5 minutes with the rotary mixer, and the compression making tablet was performed having used the fill as 10g / 1 lock for the obtained mixture with the rotary system tableting machine, and the fixation tablet B of a cylindrical shape with a diameter of 30mm was produced.
[0078] (Measurement of a dissolution duration) Solid-state development tablet A agent 50 locks and B agent 50 locks were put in in the solid-state processing agent prehension means of solid-state processing agent dissolution equipment, and it dissolved, adding and circulating through 4400ml of 35-degree C water. Under the present circumstances, time amount until the dissolution is completed from the flash which poured in water was measured.
[0079] Solid-state fixation tablet A agent 90 locks and B agent 30 locks were similarly put in in the solid-state processing agent prehension means of solid-state processing agent dissolution equipment, and it dissolved, adding and circulating through 4200ml of 35-degree C water. Under the present circumstances, time amount until the dissolution is completed from the flash which poured in water was measured.
[0080] The conditions of each means are the following among solid-state processing agent dissolution equipment.
[0081] Solid-state Processing Agent Prehension Means : 1. Area 2, Diameter of 3Mm of Hole of 180Cm of Opening, 2. -- minute solid-state processing agent prehension

means: -- area 2 and the diameter of 1mm of a hole of 150cm of opening 3. -- solid-state processing agent side circulation regurgitation means: -- discharge part diameter [of 2mm] x20 hole, and 4. solid-state processing agent -- ten spheres of a vinyl chloride with an antisticking means:diameter of 6mm 5. -- lock out prevention means [of a minute solid-state processing agent prehension means]: -- they are the diameter of 140mm, and six sphere [of a vinyl chloride with a diameter of 6mm], and floating generating means:span 10mm six-sheet configuration in 6. tub -- as a comparison The dissolution duration was measured using the conventional dissolution approach which consists of only a solid-state processing agent dissolver and a circulation means.
[0082] These results were collectively shown in a table 1.
[0083]
[A table 1]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view showing the concept of the solid-state processing agent dissolution equipment of this invention.
[Description of Notations]
1 Solid-state Processing Agent Dissolver
2 Circulation Means
3 Circulation Means Absorption Opening
4 Circulating Pump
5 Solid-state Processing Agent Side Circulation Regurgitation Means
6 Circulation Regurgitation Means
7 Minute Solid-state Processing Agent Prehension Means
8 Solid-state Processing Agent Prehension Means
9 Solid-state Processing Agent
10 Minute Solid-state Processing Agent
11 Solid-state Processing Agent Antisticking Means
12 Lock Out Prevention Means of Minute Solid-state Processing Agent Prehension Means 7
13 Floating Generating Means in Tub
14 Feed Water
15 Processing Liquid Exhaust Port

[0084] A table 1 shows that the solid-state processing agent dissolution equipment of this invention has the outstanding melting capacity.